

8. FIRST STAGE ENGINE PREPARATION

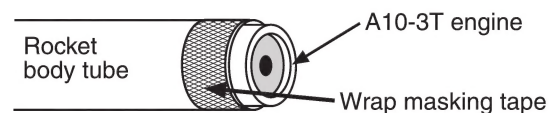
- A. Separate igniter and plug. B. Insert igniter. C. Insert plug. D. Push down. E. Gently bend igniters to form leads as shown. F. Insert engine into rocket.

WARNING: FLAMMABLE

To avoid serious injury, read instructions & NAR Safety Code included with engines. **PREPARE ENGINE ONLY WHEN YOU ARE OUTSIDE AT THE LAUNCH SITE PREPARING TO LAUNCH!** If you do not use your prepared engine, remove the igniter before storing engine.

9A. SECOND STAGE ENGINE PREPARATION

When inserting the A10-3T mini engine into each of the second stage rockets, apply a small piece of masking tape approximately 1/2 around the engine and body tube to hold the engine in place.



9B. PREPARE RECOVERY SYSTEM

- A. Pull shock cord taut when inserting wadding. B. Insert 1/2 square of loosely crumpled recovery wadding into rocket. Push below shock cord attachment. C. Insert shock cord and nose cone into body tube.

NOTE: Only Estes Recovery Wadding (302274) recommended.

IMPORTANT: Wadding must be in place and slide freely for recovery system to work properly.

ESTES LAUNCH SUPPLIES

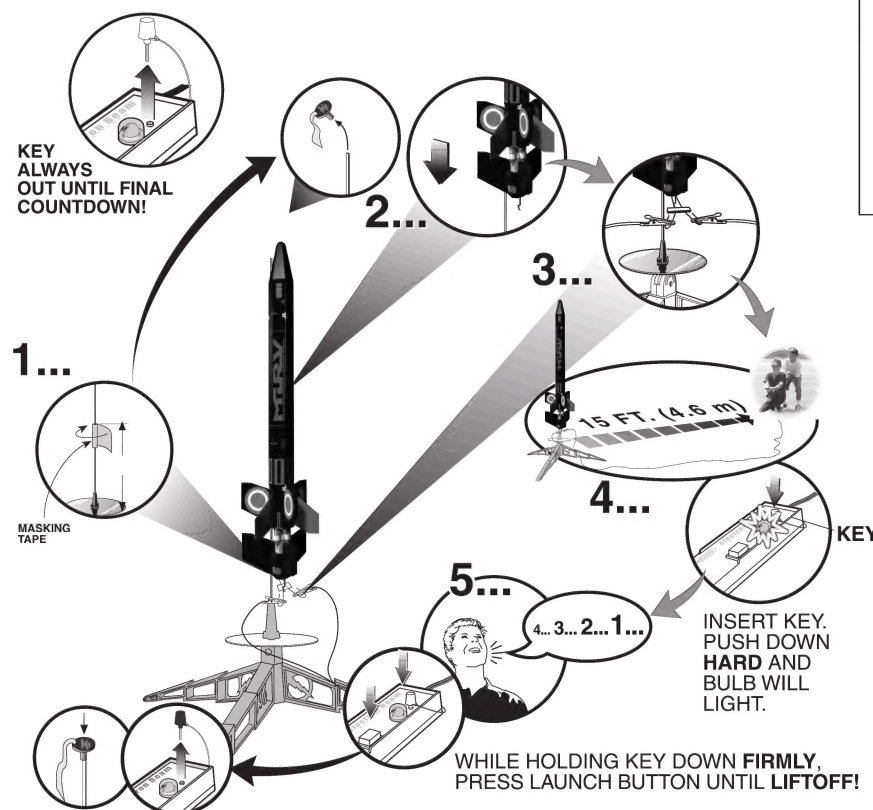
- (Sold Separately)
- Porta Pad® II Launch Pad
 - Electron Beam® Launch Controller
 - Recovery Wadding (included with some engines)
 - Igniters and Igniter Plugs (included with Estes engines)
 - Recommended Engines: Second Stage; A10-3T (3) First Stage-Booster B6-0, C6-0

EXHAUST MANIFOLD CLEANING INSTRUCTIONS

- Cleaning the manifold every few flights is very important.
- Use a fresh, moist cotton swab to scrub the inside surfaces of each manifold outlet to get all of the deposits off the inside walls of the manifold.
- After cleaning with water, wipe out the upper cavity of the manifold where each upper stage engine mounts for launch with another cotton swab.
- Be sure to wipe off the sidewalls of the exhaust manifold where the engines fit as any exhaust buildup here will eventually make the engines fit too tightly in the manifold.

What to expect when flying your MIRV™ staged rocket. The MIRV™ is really 4 rockets in one; at ignition the booster stage will burn quickly to get the MIRV™ off the launch pad. After the boost stage, the 3 second stage rockets will ignite and separate from the booster and climb to apogee where the nose cone will eject and the second stage rockets will tumble to the ground. This launch sequence happens very quickly and there are 4 rockets to keep your eye on. We recommend that you have a launch partner along to help you "spot" the various booster and second stage rockets as they return to the ground after launch.

10. COUNTDOWN AND LAUNCH



PRECAUTIONS



NO DRY GRASS OR WEEDS
This Paper
Can Be Recycled

PRE-LAUNCH CHECK

For safety, never launch a damaged rocket. Check the rocket's body, nose cone and fins. Also, check the engine mount, recovery system and launch lug(s). Repair any damage before launching the rocket.

FLYING YOUR ROCKET

Choose a large field (500 ft. [152 m] square) free of dry weeds and brown grass. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are great. Launch only with little or no wind and good visibility. Always follow the National Association of Rocketry (NAR) SAFETY CODE.

MISFIRES

TAKE THE KEY OUT OF THE CONTROLLER. WAIT ONE MINUTE BEFORE GOING NEAR THE ROCKET! Disconnect the igniter clips and remove the engine. Take the plug and igniter out of the engine. If the igniter has burned, it worked but did not ignite the engine because it was not touching the propellant inside the engine. Put a new igniter all the way inside the engine without bending it. Push the plug in place. Repeat the steps under Countdown and Launch.



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Penrose, CO 81240-0227
Printed in Guangdong, China

MIRV™

Multiple Independent Reentry Vehicle
FLYING MODEL ROCKET KIT INSTRUCTIONS
KEEP FOR FUTURE REFERENCE

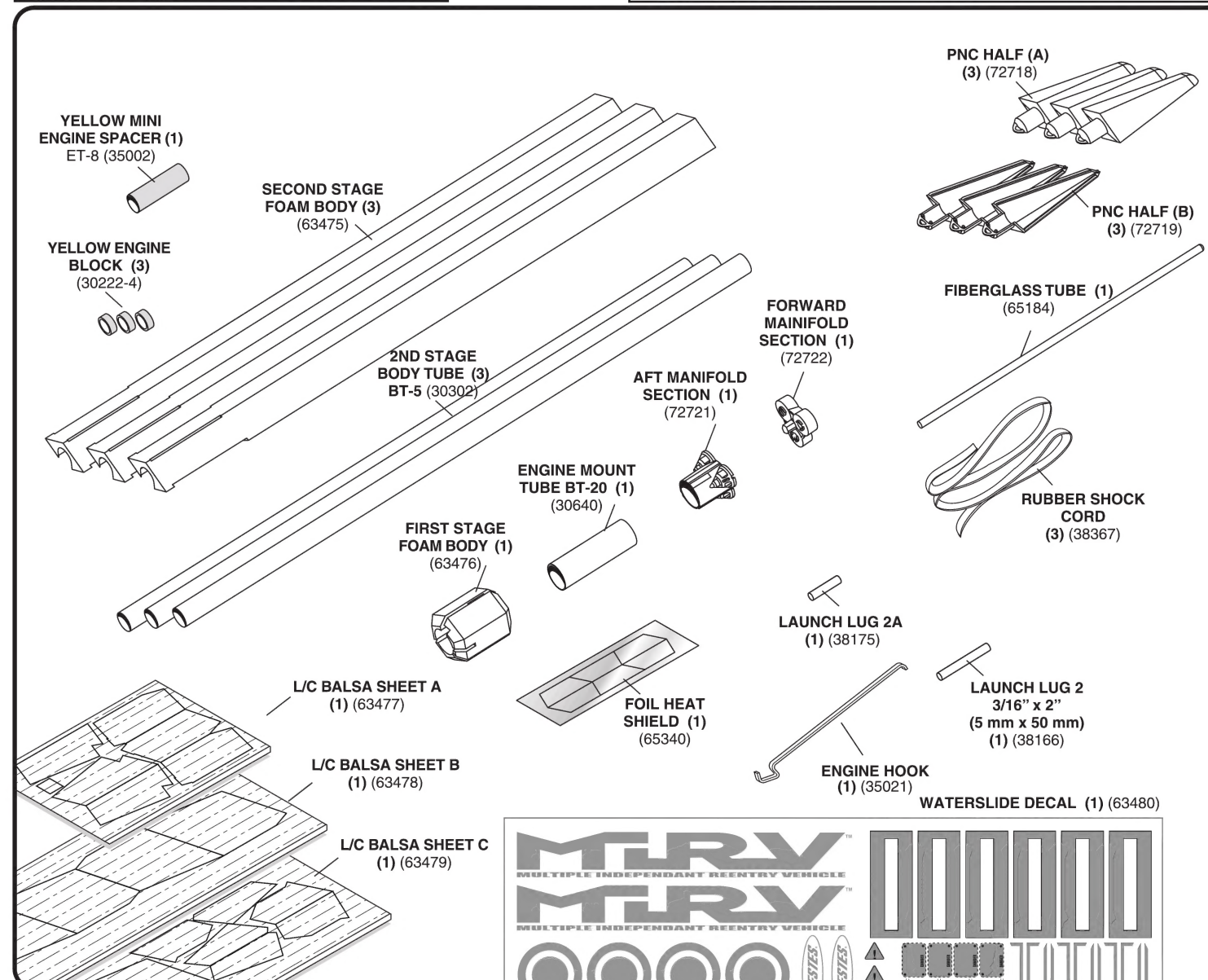
#2134



ASSEMBLY TIP: Read all instructions before beginning work on your model. Make sure you have all parts and supplies.

NOTE: Test fit all parts together before applying glue. If parts don't fit properly, sand as required for precision assembly.

IMPORTANT: Your Estes product is marked with a four digit lot code or codes. The code is two digits, a space and two more digits representing the week and year of manufacture, respectively. Lot codes can be found on the product package, decal, launch controller, launch pad and/or blast deflector. Please record the lot code found on the decal and keep for future reference. Lot code: _____



SUPPLIES In addition to the parts included in the kit you will also need:



SCISSORS



PENCIL



RULER



FINE SANDPAPER (#220-#400 GRIT)



CARPENTER'S GLUE



MODELING KNIFE



MASKING TAPE



PLASTIC CEMENT



SPRAY PRIMER (WHITE)



SPRAY PAINT (BLACK)



SPRAY PAINT (RED)



CLEAR SPRAY (OPTIONAL)



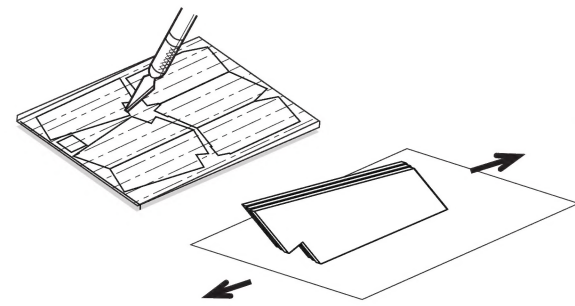
WAX PAPER



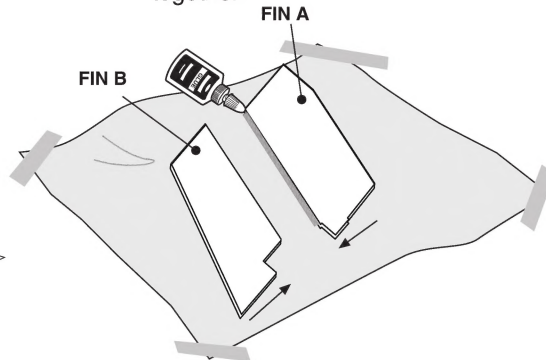
SANDING BLOCK

1. FIRST STAGE ASSEMBLY

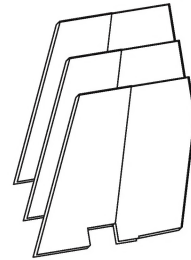
A. Remove the 1st stage balsa fins. Stack like pieces together and sand the edges flat.



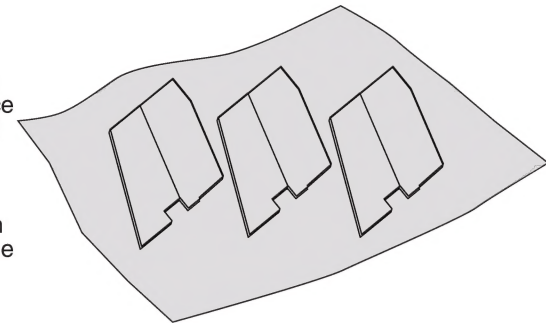
B. Position the pieces (A and B) over a piece of wax paper as shown and glue the halves together.



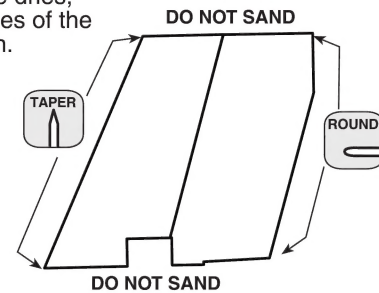
C. Repeat this step for the other 2 fin assemblies.



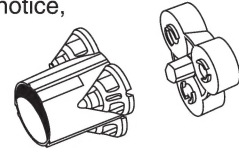
D. After gluing the 3 fins together, place a piece of waxed paper over the assembled fins and place something flat on top of the fins while the glue sets.



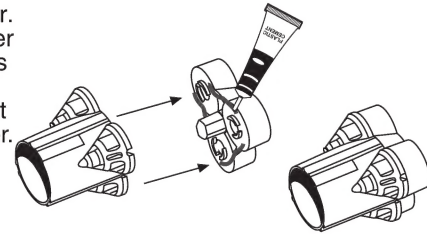
E. After the glue dries, sand the edges of the fins as shown.



A. Locate the two plastic manifold pieces and read the notice on the upper manifold part. After you have read this notice, remove the sticker.

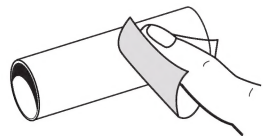


B. Test fit the two manifold parts together. If satisfied with the fit, apply a thin layer of plastic cement as shown and press the two halves together. Allow the cement to set while applying constant pressure holding the two parts together.

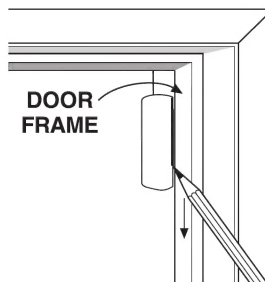


Note: Do not apply too much cement to the manifold parts.

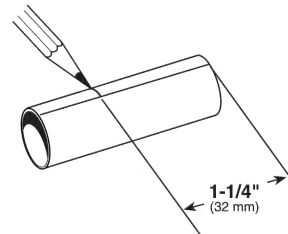
A. Sand the exterior surface of the engine mount tube.



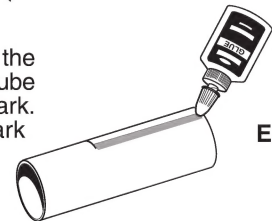
B. Use a door frame as shown. Draw a straight line on the engine mount tube along the entire length.



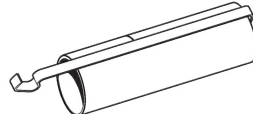
C. Place a mark at a point 1 1/4" (32 mm) from one end of the engine tube.



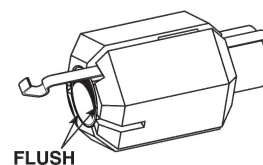
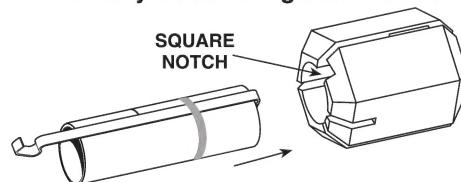
D. Apply a bead of glue on the line from the end of the tube to the 1 1/4" (32 mm) mark. Do not glue past the mark at 1 1/4" (32 mm).



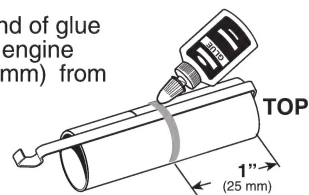
E. Place the engine hook in the glue as shown and allow the glue to dry.



G. Align the square notch in the rear of the first stage foam part with engine hook and press the engine tube into the foam until the engine tube is flush. Note: It is important that the foam body be oriented on the engine mount assembly with the engine hook to move freely.

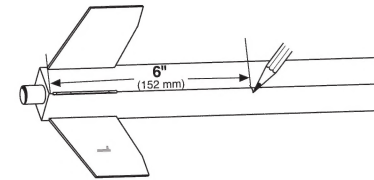


F. Place a band of glue around the engine tube 1" (25 mm) from the top.

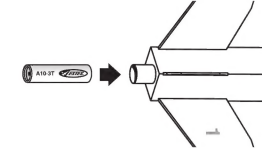


Note: DO NOT USE plastic type cement as it will melt the foam.

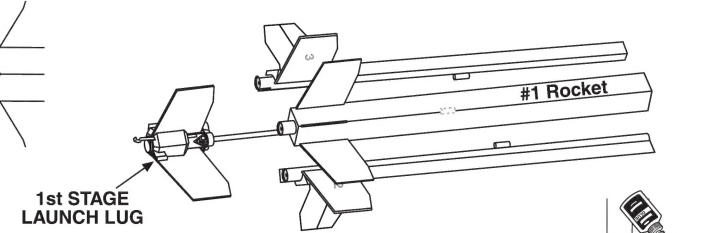
G. Measure 6" (15.2 cm) up from the bottom of the #1 second stage rocket and place a mark on the foam as indicated.



H. Next, insert an A10-3T mini engine in to the base of each second stage rocket.

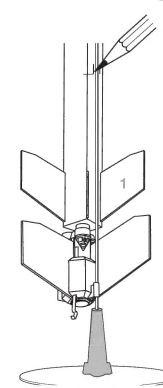


I. Assemble the 2nd stage rockets on the 1st stage booster as shown. (Be sure to assemble the 2nd stage rockets with the 1st stage booster such that the 1st stage launch lug lines up with rocket #1 as shown).



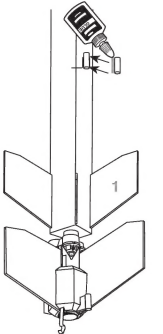
J. Carefully place the assembled rocket on your launch pad with the launch rod passing through the bottom launch lug and align the rocket so that it is vertical and parallel with the launch rod. Place two marks, one on each side of the launch rod rocket #1 just above the 6" (15.2 cm) mark. Now remove the rocket from the launch pad being careful not to tilt the rocket so that the bottom launch lug gets stressed.

Note: Be careful to hold the rocket vertical while doing this so that you do not stress the bottom launch lug and break it off.



K. Using the three lines you have placed on rocket #1, glue the remaining small diameter upper launch lug in place on rocket using glue.

L. After this glue has dried, apply a fillet to securely hold the upper launch lug in place and allow the glue to thoroughly dry.

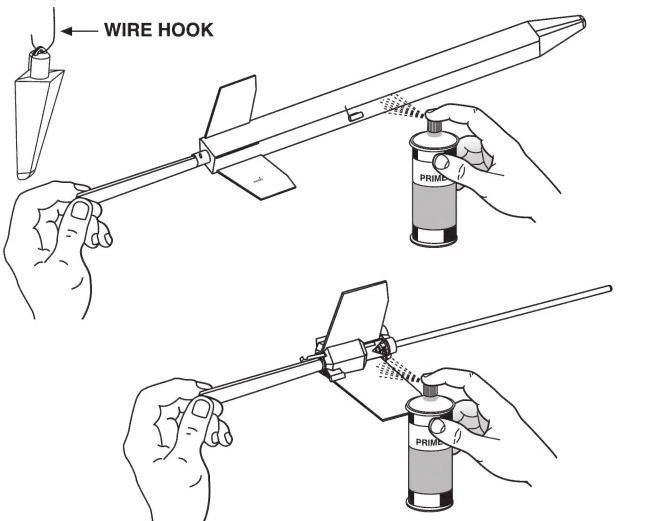


7. ROCKET FINISHING METHOD

- Adding too much paint is a sure way to increase the flying weight of your rocket. Therefore we recommend that you use at most 1 or 2 light coats (primer or paint) with light sanding (primer coats) to provide a smooth finish on your MIRV™.
- Before painting your MIRV™, make sure all the glue joints are completely dry.
- Lightly sand the balsa, foam and body tubes to provide a smooth base for the primer and color paints.
- Use a stick inserted into the engine mount tube on the 1st stage booster and 2nd stage rockets to create handles for applying primer and paint.
- Bend wire hooks to hold the 3, second stage nose cones during painting.

PAINTING THE MIRV™ ROCKET

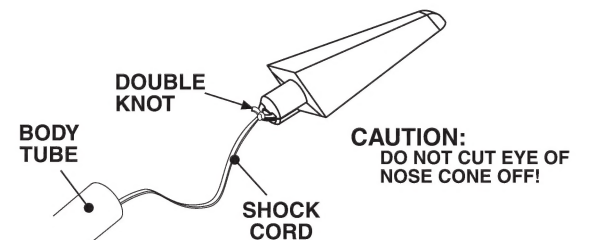
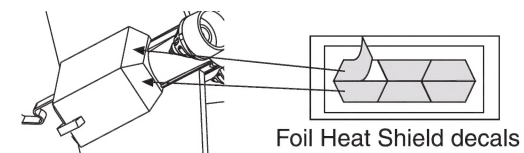
Since the MIRV™ rocket is a mix of foam, plastic, body tubes and balsa, it will be necessary to apply a foam safe primer to the rocket. We have found Testor's Model Master 2937 (gray) or 2948 (white) spray primer to be good for this application. **Do not use any type of automotive or lacquer based primer as it will destroy the foam.**



- Spray a light coat of primer on the 1st and 2nd stage rockets. Do not apply too much and allow the primer to thoroughly dry.
- Lightly sand the 1st and 2nd stage rockets with fine sandpaper.
- Apply another coat of primer if required and sand again with fine sandpaper.
- Spray paint rocket, see package for color scheme.
- After the paint is thoroughly dry, apply the decals referring to the instructions or decoration image shown on the package.

DECORATING THE MIRV™ ROCKET

- Apply waterslide decals where shown.
 - Cut decals to be applied from decal sheet, trimming close to the decal edge.
 - Place one decal at a time in bowl of warm water until decal begins to curl.
 - Remove decal, position in place and slide decal off of backing material and onto the model as close to final position as possible.
 - Gently blot excess water with a clean paper towel. Allow decals to set overnight.
 - Apply protective clear coat, optional. This will provide added protection and shine to your MIRV™ rocket!
- Apply the six self-stick Foil Heat Shield pieces to the 1st stage booster as shown below.
- After painting and decorating your rocket attach the nose cone to the shock cord as shown below.



CAUTION: DO NOT CUT EYE OF NOSE CONE OFF!

2. SECOND STAGE BODY ASSEMBLY

A. Using #220 grit sandpaper, lightly sand all three 2nd stage rocket body tubes.

B. Roll a small piece of #220 grit sandpaper and lightly sand the inside edge of each end of all 3 body tubes.

C. Using glue, place a small, but continuous bead of glue along both sidewalls of the foam second stage cavity.

E. Set the body tube assembly aside to dry.

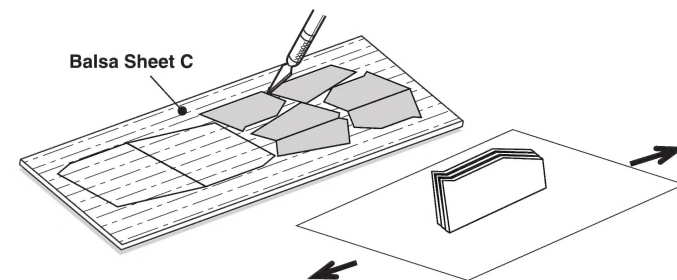
F. Repeat steps C and D for the remaining 2nd stage rockets.

D. Immediately press a second stage body tube into the glued cavity making sure that the forward end of the body tube is flush with the forward end of the foam body. Repeat this step for each of the remaining 2 foam parts and body tubes.

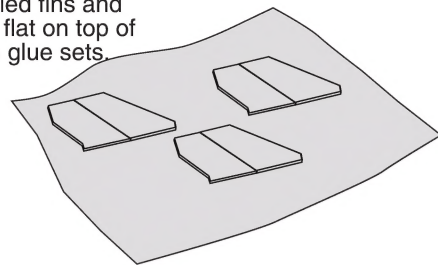
TOP OF
SECOND
STAGE FOAM
BODY

3. FIN ATTACHMENT

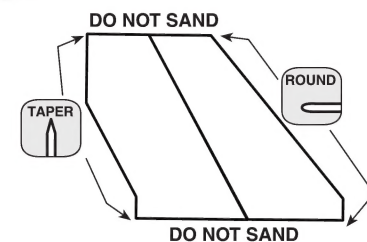
A. Using a sharp hobby knife, cut out the six 2nd stage fins, stack them together and sand all edges flat.



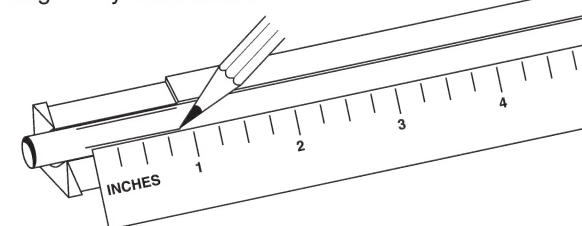
C. After gluing the 3 fins together, place a piece of waxed paper over the assembled fins and place something flat on top of the fins while the glue sets.



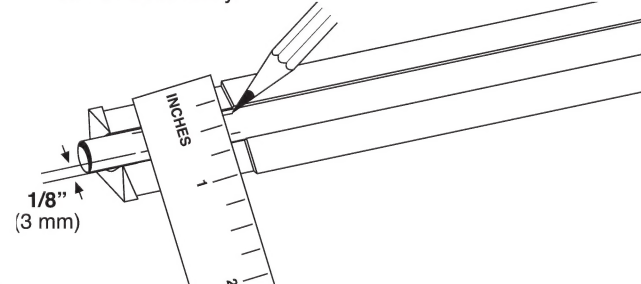
D. Once the glue has set, sand the sides of the fins to remove any dried glue bumps along the seam.



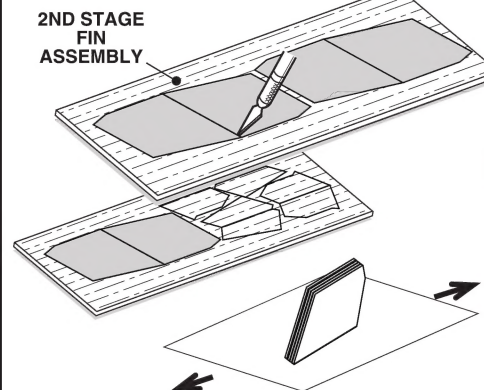
F. Draw a straight line between these marks. You will use this line as a reference point for gluing the fin in place. Repeat this step on the remaining 2 second stage body assemblies.



E. Using a ruler on the fin cutout portion of the 2nd stage foam body, place a mark on the top and bottom of the body tube 1/8" (3 mm) away from the inside edge of the foam body.



G. Using a sharp hobby knife, cut out the six 2nd stage side fins, stack them together and sand all edges flat.



H. Sand the sides of the fins to remove any dried glue bumps along the seam.

I. Glue the side fins in place with white glue and align the bottom of the side fins with the line on the body tube. Allow the glue to dry on each fin before proceeding to the next fin attachment.

J. After the glue has dried on all of the upper stage rockets, place a fillet along the inside edge of the fin and the body tube as shown.

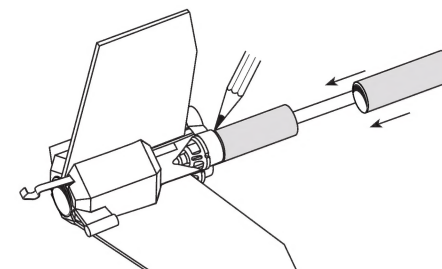
L. Using plastic cement, glue both halves of the plastic nosecones together as shown. Wipe any excess glue to avoid a tight fitting nosecone.

COMPLETED
ASSEMBLY

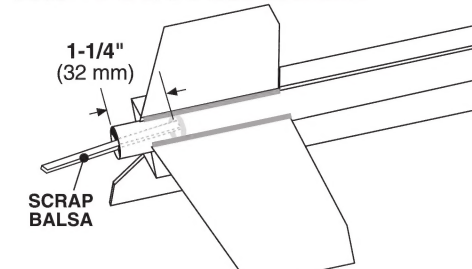
REAR VIEW

4. FINAL ASSEMBLY

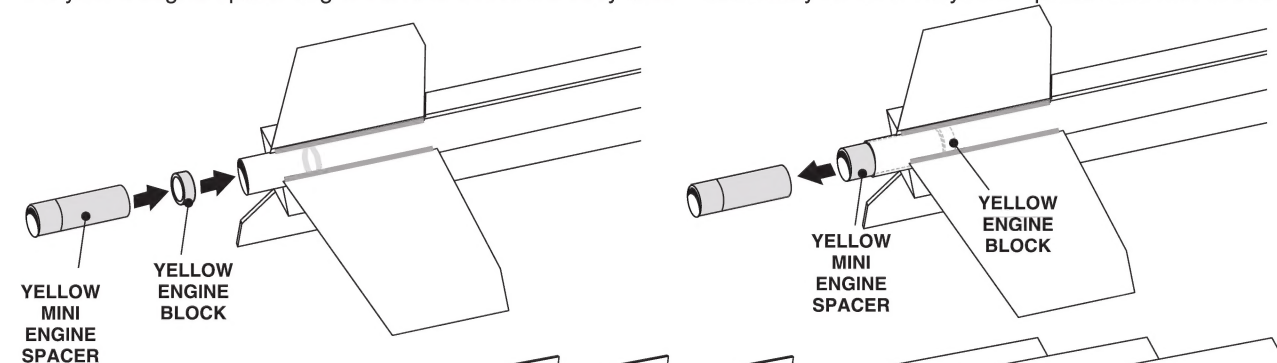
A. Insert the yellow engine spacer tube fully into the top opening of the manifold and draw a line around the tube.



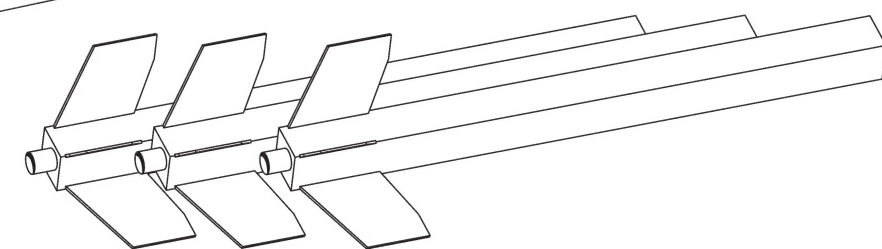
B. Using a piece of scrap balsa, smear a ring of white glue on the inside of the 2nd stage rocket body tube 1 1/4" (32 mm) from the bottom end of the tube as shown.



C. To set the correct mini engine motor depth in the 2nd stage rocket, insert the yellow engine block ring into the tail end of the rocket body tube and insert the yellow engine spacer into the tube and push the yellow spacer tube forward until the line you drew on the yellow engine spacer aligns with the end of the body tube. Immediately remove the yellow spacer tube from the body tube.

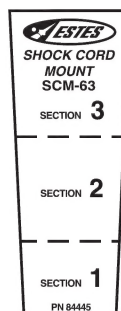
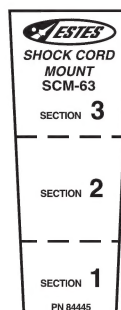
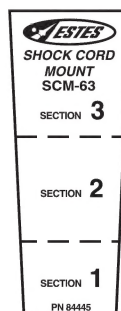


D. Repeat steps 1 and 2 for the remaining 2nd stage rockets and allow the glue to thoroughly dry.



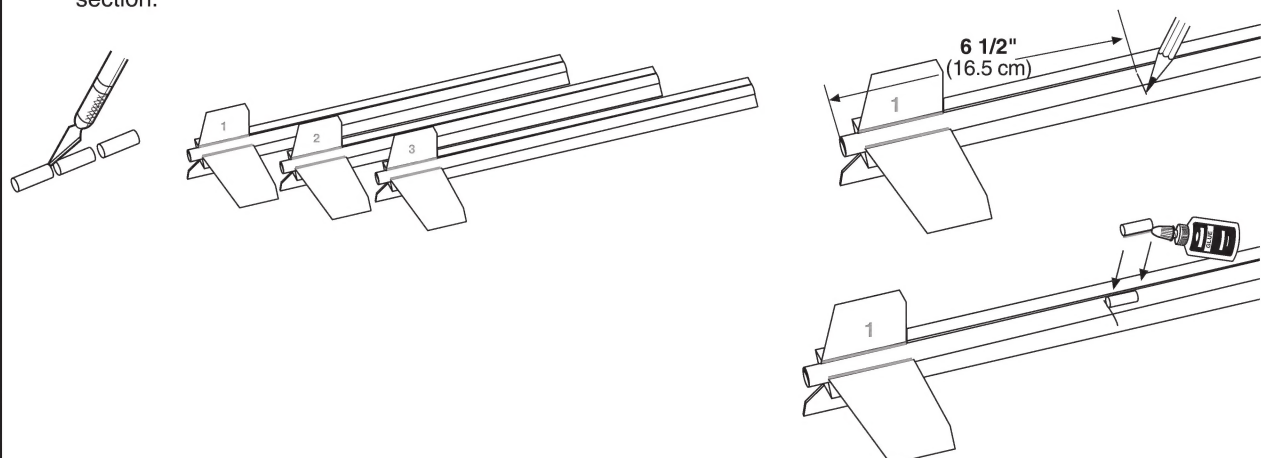
5. INSTALL SHOCK CORD

- A.** Cut out 3 shock cord mounts.
- B.** Fold.
- C.** Apply glue. Fold forward.
- D.** Apply glue. Fold forward.
- E.** Squeeze tightly and hold for one minute.
- F.** Glue mount 1 1/2" (38 mm) inside front of body tube. Hold until glue sets. Let dry.
- G.** Repeat steps B-F for remaining second stage rockets.
- YES**
- NO**

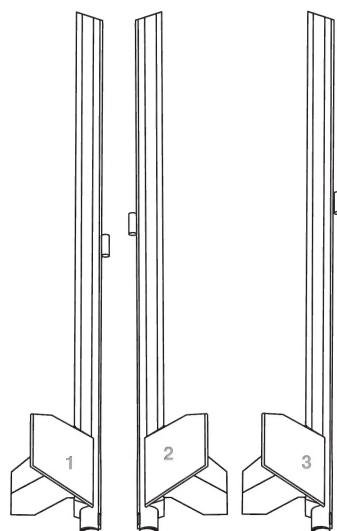


6. ATTACH LAUNCH LUGS

- A.** Cut the larger 3/16" (5 mm) X 2" (50 mm) launch lug into 3 equal lengths, each 5/8" (16 mm) long and discard the remaining small section.
- B.** Label each 2nd stage rocket #1, #2 and #3 in an inconspicuous spot on the rocket, such as the inside face of the side fins.
- C.** On rocket #1, place a mark centered on the body tube 6.5" (16.5 cm) from the bottom end of the tube. Glue one of the 5/8" (16 mm) launch lug pieces to the body tube just above this mark.
Note: be sure that the launch lug is straight along the launch axis of the rocket.

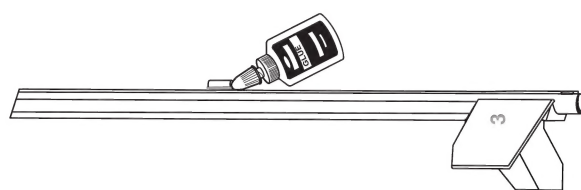


- D.** Place rocket #2 against rocket #1 in the way it will go together upon final assembly and stand both rockets on a table so that the bottom ends of both body tubes are touching the table. Place a mark on the body tube of rocket #2, just above the launch lug of rocket #1. Glue another 5/8" (16 mm) launch lug on rocket #2 just above the mark you made.

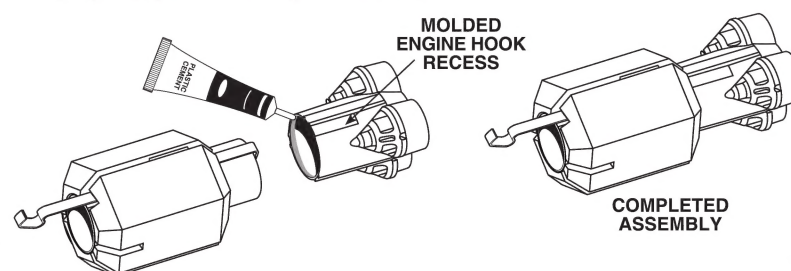


- E.** Following this same launch lug placement, glue the remaining launch lug in the appropriate spot on rocket #3.

- F.** After the glue dries on all 3 launch lugs, apply glue fillets and allow these to thoroughly dry.

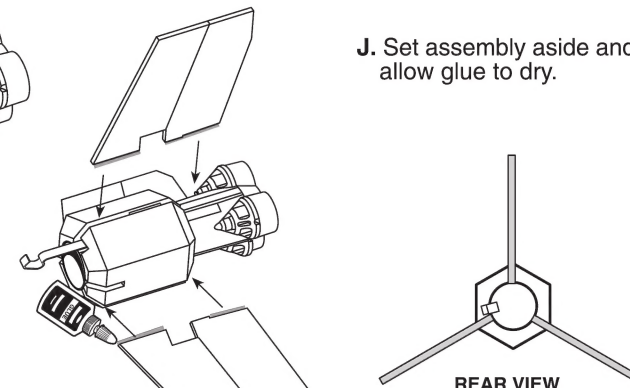


- H.** Using plastic cement, place a small amount of cement just inside the manifold as shown. Position the manifold at the end of the engine tube and note the molded engine hook recess in the manifold. When aligned properly, press the engine tube in place.

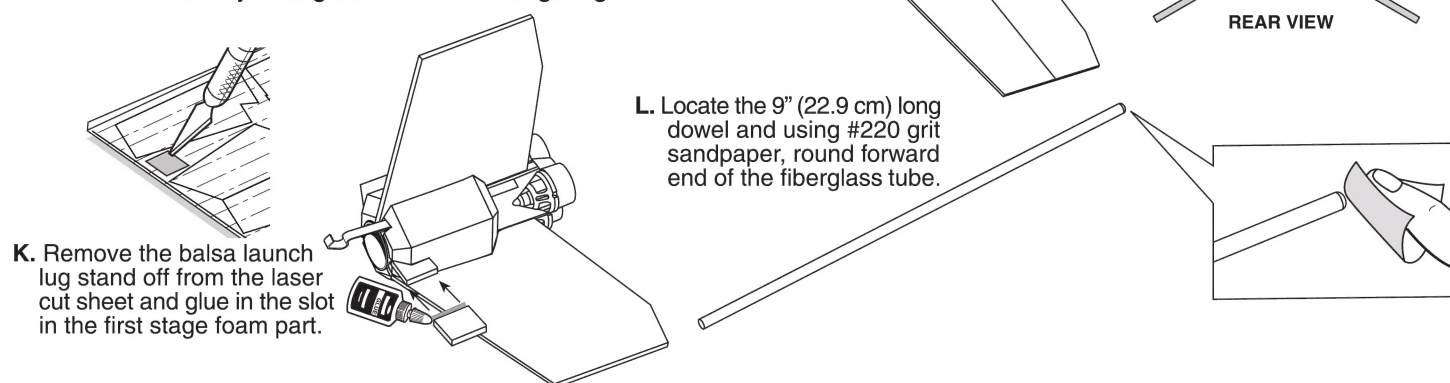


Note: Extreme care is required to avoid putting excess cement into the manifold opening. Too much cement will interfere with proper movement of ejection gases from the 1st stage engine

- I.** Test fit the first stage fins in their respective slots. Sand as required for a good fit and then glue in place making sure the fins align properly.

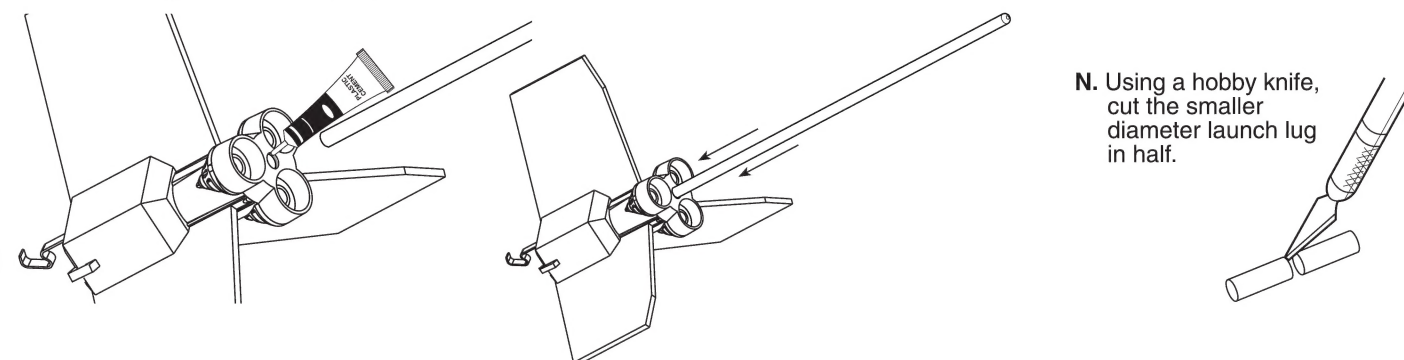


- J.** Set assembly aside and allow glue to dry.



- K.** Remove the balsa launch lug stand off from the laser cut sheet and glue in the slot in the first stage foam part.

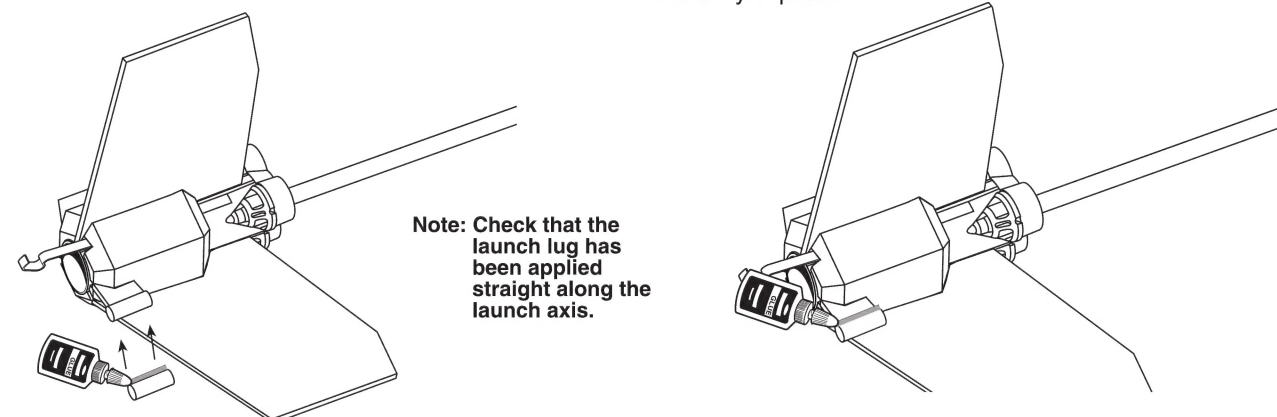
- M.** Apply a small amount of plastic cement in the hole in the manifold section and press rear end of the fiberglass tube firmly in place.



- N.** Using a hobby knife, cut the smaller diameter launch lug in half.

- O.** Place a bead of glue on the launch lug as shown and place on the standoff. Set the other launch lug piece aside for now.

- P.** After the glue dries, apply a glue fillet to each side of the launch lug to hold the launch lug securely in place.



Note: Check that the launch lug has been applied straight along the launch axis.